Assignment 6 part I: The Endocrine System, Chapter 16

Due: 11:59pm on Monday, March 4, 2013

Note: To understand how points are awarded, read your instructor's Grading Policy.

Art-labeling Activity: Figure 16.1

Part A

Drag the appropriate labels to their respective targets.

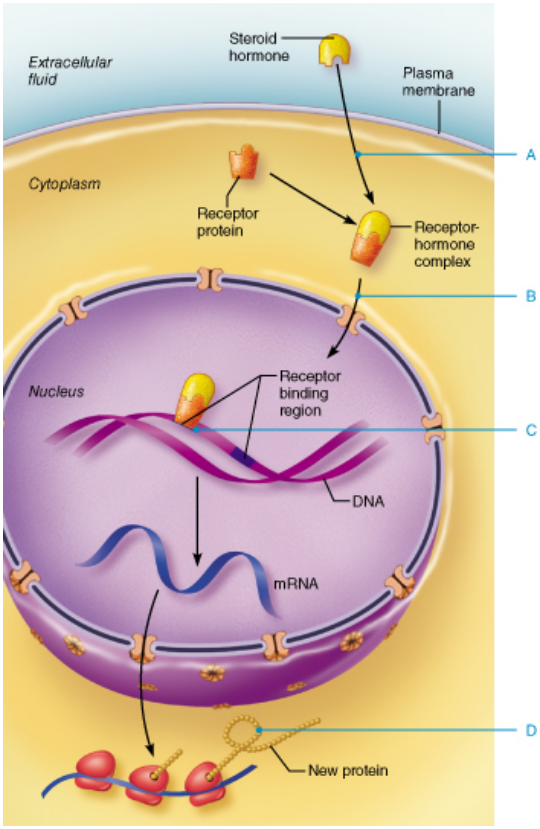
ANSWER:

Correct

Art Question Chapter 16 Question 6

Part A

What amino acid-based hormone uses the direct gene activation method illustrated in this image?



ANSWER:

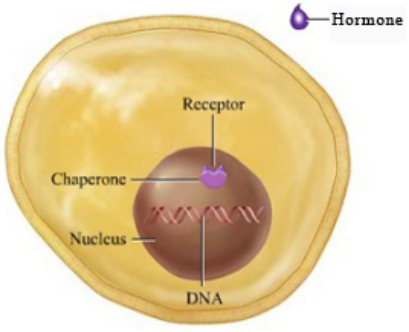
- glucocorticoids
- thyroxine
- mineralocorticoids
- growth hormone

Correct

IP: Mechanism of Hormone Action: Direct Gene Activation

Click on the link or the image below to explore Mechanism of Hormone Action: Direct Gene Activation in Interactive Physiology (IP), then answer the questions to the right.

IP: Mechanism of Hormone Action: Direct Gene Activation



Part A

Which of the following hormones has intracellular receptors?

Hint 1.

Remember that a hormone must be lipid-soluble to diffuse through the plasma membrane.

ANSWER:

- cortisol
- epinephrine
- insulin

Correct

Yes, cortisol is one of the lipid-soluble steroid hormones. Thyroid hormones are also lipid soluble.

Part B

What is the mechanism of action of lipid-soluble hormones?

Hint 1.

Remember that lipid-soluble hormones can diffuse through membranes.

ANSWER:

- phosphorylation of intracellular proteins
- activation of genes, which increases protein synthesis in the cell
- increasing protein kinases

Correct

Yes, lipid-soluble hormones diffuse into the nucleus or they diffuse into the cytoplasm and then move into the nucleus, where they affect transcription and translation.

Part C

After a lipid-soluble hormone is bound to its intracellular receptor, what does the hormone complex do?

Hint 1.

Think about the mechanism of action of lipid soluble hormones, such as thyroid hormones.

ANSWER:

- phosphorylates a protein
- activates a protein kinase
- acts as a transcription factor and binds to DNA, activating a gene
- directly alters protein synthesis at the ribosome

Correct

Yes, then mRNA is synthesized.

Part D

Which hormone's receptor is always bound to DNA, even when the receptor is empty?

Hint 1.

Think of the types of hormones. Which of the following hormones is lipid soluble?

ANSWER:

- thyroid hormone
- cortisol
- insulin

Correct

Yes, thyroid hormones are lipid soluble and their receptors are bound to the response elements of the DNA.

Part E

What keeps intracellular receptors from binding to DNA before a hormone binds to the receptor?

Hint 1.

Is there something that could stop intracellular receptors from binding to DNA?

ANSWER:

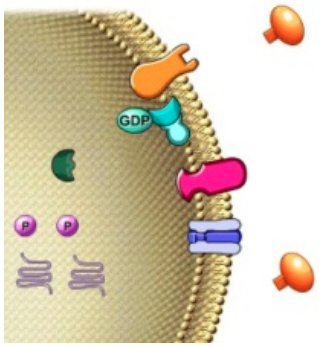
- chaperone proteins (chaperonins)
- Receptors can't enter the nucleus until the hormone is bound to it.
- transcription factors

Correct

Yes, each receptor has two binding sites. The chaperone protein blocks the DNA binding site until a hormone binds at the hormone binding site.

IP: Mechanism of Hormone Action: Second Messenger System

Click on the link or the image below to explore Mechanism of Hormone Action: Second Messenger System in Interactive Physiology (IP), then answer the questions to the right.
IP: Mechanism of Hormone Action: Second Messenger System



Part A

What type of hormones bind to receptors located on the cell membrane?

Hint 1.

Think about the plasma membrane and choose between water-soluble and lipid-soluble hormones.

ANSWER:

- water-soluble hormones, such as insulin and epinephrine
- lipid-soluble hormones, such as thyroid hormones and cortisol

Correct

Yes, peptides and catecholamines are water-soluble hormones that cannot diffuse through the plasma membrane.

Part B

Which intracellular substance degrades cAMP, thus inactivating the response to a hormone?

Hint 1.

Review the steps in the cAMP signaling mechanism.

ANSWER:

- phosphodiesterase
- protein kinase C
- adenylate cyclase
- phospholipase C

Correct

Yes, phosphodiesterase is an intracellular enzyme that degrades cAMP.

Part C

Growth factor hormones, such as insulin, bind to which type of receptor?

Hint 1.

These receptors work without a second messenger.

ANSWER:

- intracellular receptors
- tyrosine kinase receptors
- G proteins

Correct

Yes, insulin binds to tyrosine kinase receptors and works without a second messenger.

Part D

Which is the correct order of events for hormones activating G_s proteins?

Hint 1.

G_s proteins are stimulatory proteins.

ANSWER:

- activation of G protein, binding of GTP, activation of phospholipase C, activation of DAG and IP_3
- activation of G protein, binding of GTP, activation of adenylate cyclase, conversion of ATP to cAMP
- activation of a G protein, tyrosine kinase receptor, phosphorylation of intracellular proteins

Correct

Yes, G_s proteins are stimulatory proteins that activate cAMP.

Part E

Which second messenger causes the release of calcium from the endoplasmic reticulum?

Hint 1.

Second messenger systems can phosphorylate ion channels and proteins.

ANSWER:

- IP3
- DAG
- tyrosine kinase
- cAMP

Correct

Yes, inositol trisphosphate releases calcium from intracellular storage sites.

Part F

Which of the following adrenergic receptors increase cAMP levels?

Hint 1.

Receptors that bind epinephrine and norepinephrine are called adrenergic receptors.

ANSWER:

- α_1 receptors
- β receptors
- α_2 receptors

Correct

Yes, these receptors are coupled to adenylate cyclase by Gs receptors that increase cAMP.

Chapter 16 Chapter Test Question 6

Part A

The stimuli causing endocrine glands to secrete their hormones in direct response to changing blood levels of certain critical ions and nutrients are called _____.

ANSWER:

- humoral stimuli
- neural stimuli
- endocrinal stimuli
- hormonal stimuli

Correct

Some endocrine glands secrete their hormones in direct response to changing blood levels of certain critical ions and nutrients. These stimuli are called humoral stimuli to distinguish them from hormonal stimuli, which are also bloodborne chemicals.

Chapter 16 Chapter Test Question 17

Part A

The hypothalamus is known to control the activity of the anterior pituitary, which has traditionally been called the "master endocrine gland."

ANSWER:

- True
- False

Correct

Chapter 16 Reading Quiz Question 1

Part A

What is the primary function of hormones?

ANSWER:

- activate extracellular enzymes
- cause allergic reactions
- influence metabolic activity of glands by electrochemical impulses
- alter cell activity

Correct

The primary function of hormones is to alter cell activity by altering plasma membrane permeability or membrane potential, stimulating synthesis of enzymes or regulating molecules, activating or deactivating enzymes, inducing secretory activity, or stimulating mitosis.

Chapter 16 Multiple Choice Question 15

Part A

The ability of a specific tissue or organ to respond to the presence of a hormone is dependent on _____.

ANSWER:

- the location of the tissue or organ with respect to the circulatory path
- the membrane potential of the cells of the target organ
- the presence of the appropriate receptors on the cells of the target tissue or organ
- nothing–all hormones of the human body are able to stimulate any and all cell types because hormones are powerful and nonspecific

Correct

Chapter 16 Multiple Choice Question 19

Part A

The second-messenger mechanism of hormone action operates by _____.

ANSWER:

- increasing the basal metabolic rate in the target organ
- binding to specific receptors and employing the services of G proteins and cAMP
- altering gene expression in the nuclear DNA
- synthesizing more than one hormone at a time

Correct

Chapter 16 Multiple Choice Question 21

Part A

Cells that respond to peptide hormones usually do so through a sequence of biochemical reactions involving receptor and kinase activation. In order for cells to respond, it is necessary for first and second messengers to communicate. This is possible because _____.

ANSWER:

- G protein acts as the link between first and second messengers
- hormones alter cellular operations through direct stimulation of a gene
- the hormone receptor complex moves into the cytoplasm as a unit
- peptide hormones are converted by cell membranes enzymes into second messengers

Correct

Chapter 16 Multiple Choice Question 22

Part A

Thyroid hormone (a small iodinated amine) enters target cells in a manner similar to _____.

ANSWER:

- glucagon, because the structure of glucagon is similar to that of thyroid hormone
- insulin, because insulin is a small peptide
- growth hormone, because the thyroid works synergistically with thyroid hormone
- steroid hormones, because both diffuse easily into target cells

Correct

Chapter 16 Multiple Choice Question 43

Part A

What ion is sometimes used as a second messenger of amino acid–based hormones?

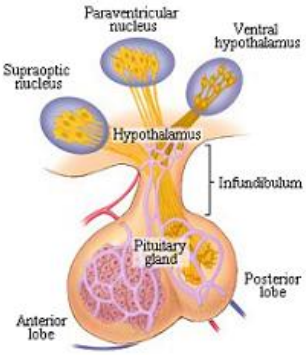
ANSWER:

- calcium
- iron
- chlorine
- sodium

Correct

IP: Hypothalamic-Pituitary Axis

Click on the link or the image below to explore the Hypothalamic-Pituitary Axis in Interactive Physiology (IP), then answer the questions to the right.
IP: Hypothalamic-Pituitary Axis



Part A

What tropic hormone stimulates cortisol from the adrenal gland?

Hint 1.

This hormone is from the anterior pituitary.

ANSWER:

- thyroid stimulating hormone (TSH)
- growth hormone (GH)
- luteinizing hormone (LH) and follicle stimulating hormone (FSH)
- adrenocorticotropic hormone (ACTH)

Correct

Yes, ACTH stimulates the adrenal cortex to produce cortisol. Stress and ACTH are the main stimuli for cortisol.

Part B

What is the function of the ventral hypothalamic neurons?

Hint 1.

This does not include the supraoptic and paraventricular nuclei.

ANSWER:

- control secretion of thyroid stimulating hormone (TSH)
- control secretion of thyroid hormones
- control secretion of antidiuretic hormone (ADH)
- control secretion of oxytocin

Correct

Yes, neurohormones from the ventral hypothalamic neurons, known as releasing (RH) and inhibiting (IH) hormones, control the release of anterior pituitary hormones such as adrenocorticotropic hormone (ACTH) and TSH.

Part C

Insulin-like growth factors (IGFs) are intermediary hormones stimulated by which of the following hormones?

Hint 1.

IGFs, also known as somatomedins, are produced by the liver.

ANSWER:

- thyroid hormones
- prolactin (PRL)
- oxytocin
- GH (growth hormone)

Correct

Yes, GH stimulates IGFs from the liver. IGFs are required for the growth effect of GH on bone and skin.

Part D

Which of the following hormones is regulated by a neuroendocrine (“letdown”) reflex?

Hint 1.

This hormone is stored in the posterior pituitary.

ANSWER:

- cortisol
- antidiuretic hormone (ADH)
- oxytocin

Correct

Yes, suckling of the infant (or stretching of the uterus) increases release of oxytocin, which causes the milk let-down effect (or increased uterine contractions).

Part E

Where is antidiuretic hormone (ADH), also known as vasopressin, synthesized?

Hint 1.

Be careful—this hormone is NOT stored where it is synthesized.

ANSWER:

- anterior pituitary
- kidney
- posterior pituitary
- hypothalamus

Correct

Yes, ADH is synthesized mainly in the supraoptic nucleus of the hypothalamus. It is stored in the posterior pituitary in axon terminals.

Part F

What is the most important regulatory factor controlling the circulating levels of thyroid hormone?

Hint 1.

This is not asking what stimulates the hormone, but how the plasma levels stay relatively constant.

ANSWER:

- thyroid-stimulating hormone (TSH)
- negative feedback
- thyrotropin-releasing hormone (TRH)
- a circadian rhythm of release

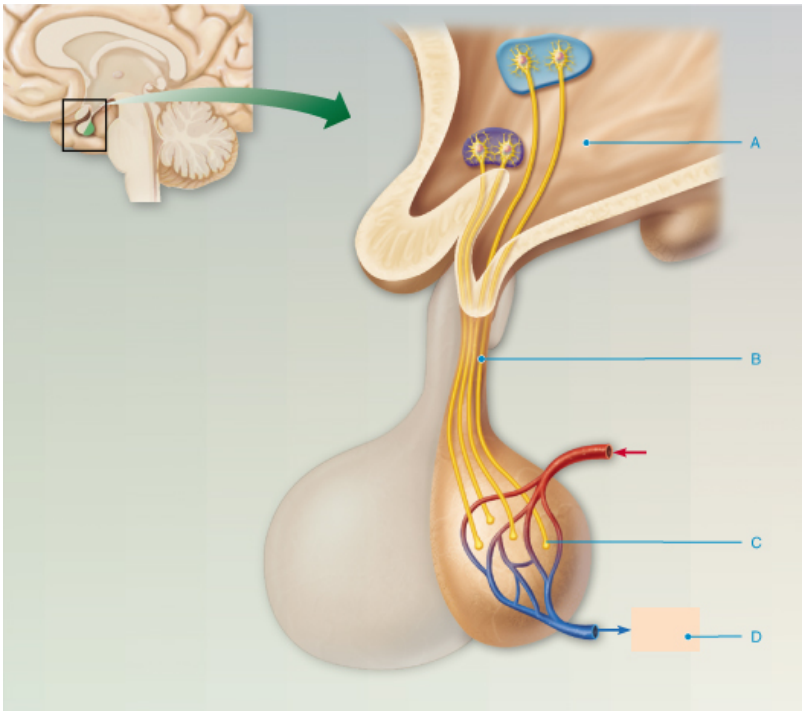
Correct

Yes, negative feedback controls the levels of circulating thyroid hormone. If levels are high, negative feedback will decrease thyroid-stimulating hormone (TSH) (and thyrotropin-releasing hormone (TRH) to some degree), thus decreasing the thyroid hormones.

Art Question Chapter 16 Question 7

Part A

Where are oxytocin and antidiuretic hormone (ADH) made? Select from letters A-D.



ANSWER:

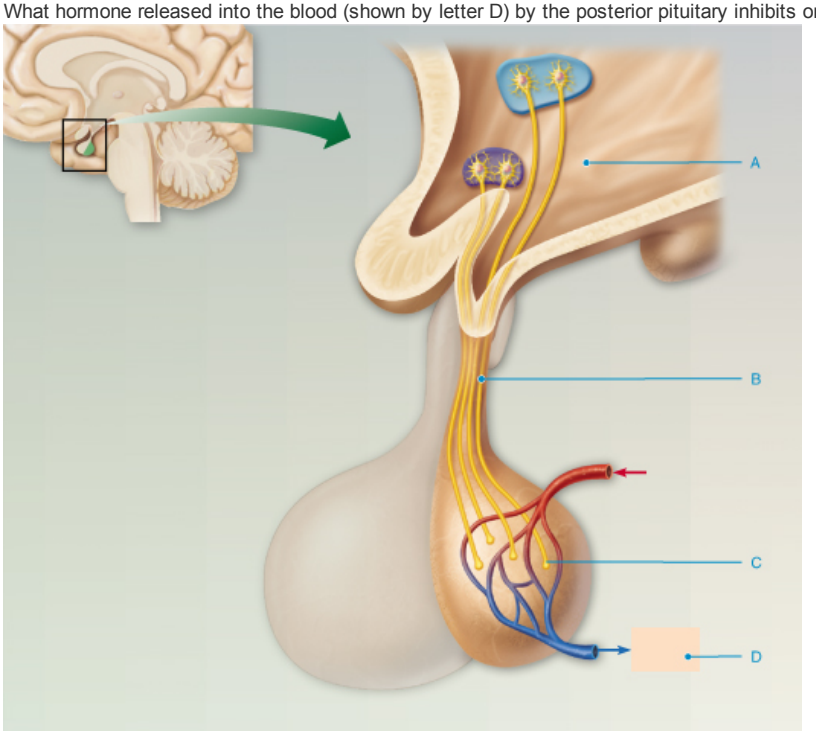
- A
- B
- C
- D

Correct

Art Question Chapter 16 Question 8

Part A

What hormone released into the blood (shown by letter D) by the posterior pituitary inhibits or prevents urine formation?



ANSWER:

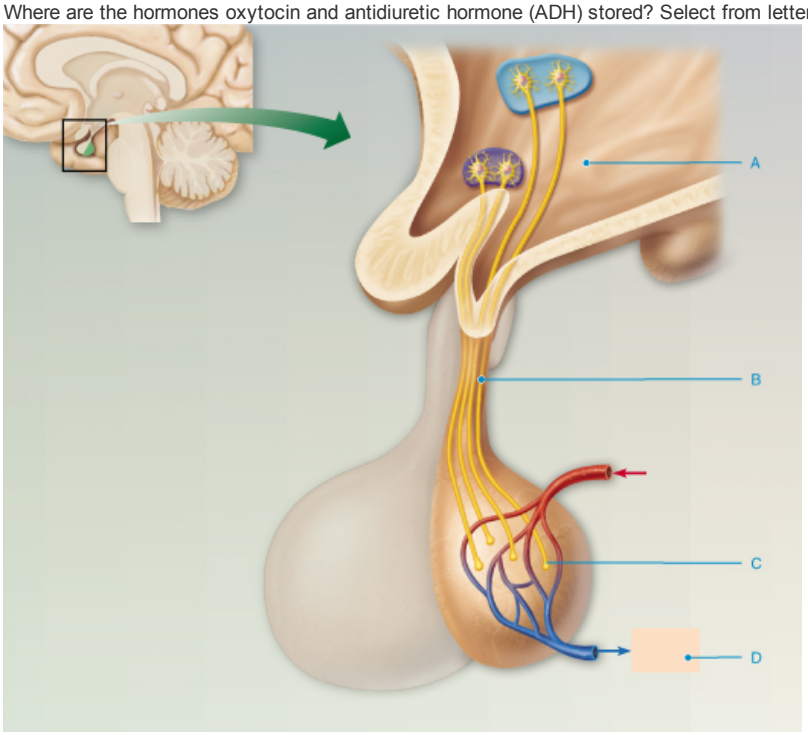
- cortisol
- oxytocin
- antidiuretic hormone (ADH)
- thyroid-stimulating hormone (TSH)

Correct

Art Question Chapter 16 Question 9

Part A

Where are the hormones oxytocin and antidiuretic hormone (ADH) stored? Select from letters A-D.



ANSWER:

- A
- B
- C
- D

Correct

Art Question Chapter 16 Question 10

Part A

Hypersecretion of what hormone can produce the effects of gigantism (individual in the center of this image)?

ANSWER:

- aldosterone
- growth hormone (GH)
- thyroid-stimulating hormone (TSH)
- thyroid hormones (TH)

Correct

Art Question Chapter 16 Question 11

Part A

What gland secretes growth hormone?

ANSWER:

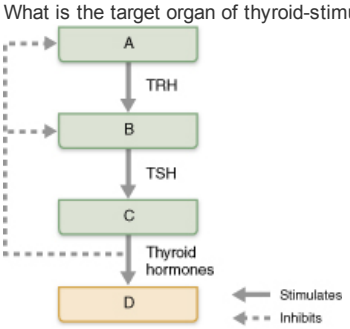
- thyroid gland
- posterior pituitary (lobe)
- anterior pituitary (lobe)
- adrenal cortex

Correct

Art Question Chapter 16 Question 14

Part A

What is the target organ of thyroid-stimulating hormone (TSH)? Select from letters A-D.



ANSWER:

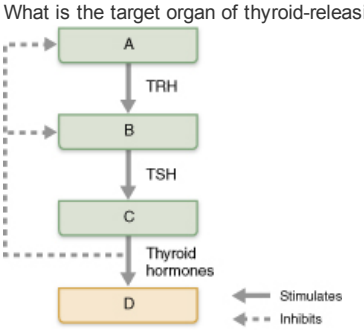
- A
- B
- C
- D

Correct

Art Question Chapter 16 Question 15

Part A

What is the target organ of thyroid-releasing hormone (TRH)? Select from letters A-D.



ANSWER:

- A
- B
- C
- D

Correct

Chapter 16 Chapter Test Question 7

Part A

Hormones that regulate the secretory action of other endocrine glands are called _____.

ANSWER:

- tropins
- somatotropin
- somatostatins
- GHIH

Correct

Tropins, or tropic hormones, are hormones that regulate the secretory action of other endocrine glands.

Chapter 16 Chapter Test Question 8

Part A

Which of the following hormones stimulates the adrenal cortex to release glucocorticoids that help the body to resist stressors?

ANSWER:

- thyroid-stimulating hormone
- prolactin
- adrenocorticotropic hormone
- follicle-stimulating hormone

Correct

Adrenocorticotropic hormone (ACTH) stimulates the adrenal cortex to release corticosteroid hormones, most importantly glucocorticoids that help the body to resist stressors.

Chapter 16 Chapter Test Question 9

Part A

Which of the following hormones mainly serves to stimulate milk production by the breasts?

ANSWER:

- follicle-stimulating hormone
- adrenocorticotropic hormone
- prolactin
- thyroid-stimulating hormone

Correct

Prolactin (PL) stimulates the mammary glands of the breasts to produce milk.

Chapter 16 Chapter Test Question 10

Part A

Which of the following hormones helps the body avoid dehydration and water overload?

ANSWER:

- thyroid-stimulating hormone
- follicle-stimulating hormone
- oxytocin
- antidiuretic hormone

Correct

Antidiuretic hormone (ADH) prevents wide swings in water balance, helping the body avoid dehydration and water overload.

Chapter 16 Homeostatic Imbalance Question 1

Part A

A blow to the head may cause diabetes insipidus by _____.

ANSWER:

- triggering the hypersecretion of hypothalamic-inhibiting hormones
- triggering the hyposecretion of hypothalamic-inhibiting hormones
- interfering with the normal transmission of ADH to the posterior pituitary via the axons of hypothalamic neurons
- causing hypersecretion of ADH

Correct

Specialized neurons of hypothalamus, called the periventricular nuclei, produce anti-diuretic hormone. A decrease in anti-diuretic hormone results in the production of large amounts of very dilute urine.

Chapter 16 Matching Question 6-10

Part A

Use the figure to match the following hypothalamic hormones with the pituitary hormone targets.

Drag the appropriate labels to their respective targets.

ANSWER:

Correct

Chapter 16 Multiple Choice Question 6

Part A

The hypothalamic-hypophyseal tract _____.

ANSWER:

- conducts aldosterone to the hypophysis
- connects the hypophysis to the pituitary gland
- is the site of prolactin synthesis
- is partly contained within the infundibulum

Correct

Chapter 16 Multiple Choice Question 9

Part A

Oxytocin _____.

ANSWER:

- is an adenohypophyseal secretion
- release is an example of a positive feedback control mechanism
- exerts its most important effects during menstruation
- controls milk production

Correct

Chapter 16 Multiple Choice Question 25

Part A

The major targets of growth hormone are _____.

ANSWER:

- the blood vessels
- the adrenal glands
- kidneys
- bones and skeletal muscles

Correct

Chapter 16 Multiple Choice Question 34

Part A

Regulating hormones from the hypothalamus _____.

ANSWER:

- enter venous circulation and travel to the heart, which pumps the hormone-containing blood to the pituitary
- enter the hepatic portal system, which feeds the pituitary
- first enter into the hypophyseal portal system
- travel by arteries to the pituitary

Correct

Chapter 16 True/False Question 6

Part A

ACTH stimulates the adrenal cortex to release corticosteroid hormones.

ANSWER:

- True
- False

Correct

Score Summary:

Your score on this assignment is 95.8%.

You received 29.69 out of a possible total of 31 points.